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Research: The President Speaks

PRESIDENT TRUMAN included the following statement on research in his recent message to the Congress when that body reconvened after a brief recess.

"Progress in scientific research and development is an indispensable condition to the future welfare and security of the Nation. The events of the past few years are both proof and prophecy of what science can do.

"Science in this war has worked through thousands of men and women who labored selflessly and, for the most part, anonymously in the laboratories, pilot plants, and proving grounds of the Nation.

"Through them, science, always pushing forward the frontiers of knowledge, forged the new weapons that shortened the war.

"Progress in science cannot depend alone upon brilliant inspiration or sudden flights of genius. We have recently had a dramatic demonstration of this truth. In peace and in war, progress comes slowly in small new bits, from the unremitting day-by-day labors of thousands of men and women.

"No nation can maintain a position of leadership in the world of today unless it develops to the full its scientific and technological resources. No government adequately meets its responsibilities unless it generously and intelligently supports and encourages the work of science in university, industry, and in its own laboratories.

"During the war we have learned much about the methods of organizing science, and about the ways of encouraging and supporting its activities.

"The development of atomic energy is a clear-cut indication of what can be accomplished by our universities, industry, and Government working together. Vast scientific fields remain to be conquered in the same way.

"In order to derive the full profit in the future from what we have learned, I urge upon the Congress the early adoption of legislation for the establishment of a single Federal research agency which would discharge the following functions:

"1. Promote and support fundamental research and development projects in all matters pertaining to the defense and security of the Nation.

"2. Promote and support research in the basic sciences and in the social sciences.

"3. Promote and support research in medicine, public health, and allied fields.

"4. Provide financial assistance in the form of scholarships and grants for young men and women of proved scientific ability.

"5. Coordinate and control diverse scientific activities now conducted by the several departments and agencies of the Federal Government.

"6. Make fully, freely, and publicly available to commerce, industry, agriculture, and academic institutions, the fruits of research financed by Federal funds.

"Scientific knowledge and scientific research are a complex and interrelated structure. Technological advances in one field may have great significance for another apparently unrelated. Accordingly, I urge upon the Congress the desirability of centralizing these functions in a single agency.

"Although science can be coordinated and encouraged, it cannot be dictated to or regimented. Science cannot progress unless founded on the free intelligence of the scientist. I stress the fact that the Federal research agency here proposed should in no way impair that freedom.

"Even if the Congress promptly adopts the legislation I have recommended, some months must elapse before the newly established agency could commence its operations. To fill what I hope will by only a temporary gap, I have asked the Office of Scientific Research and Development and the Research Board for National Security to continue their work.

(*Concluded on page 9*)

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Pending Federal Legislation for Research

By Lloyd E. Blauch*

IN a preceding issue of HIGHER EDUCATION (October 1, 1945) the evolution of Federal relations to research was described briefly, and a number of current bills to extend this development were listed. The recent statement by the President concerning this matter, as quoted the preceding page, prompts a brief review of these bills.

Meaning of Research

The word research as used in the discussions of pending Federal legislation is construed broadly. It covers the following categories: (1) Pure research; (2) background research; and (3) applied research and development.[1]

Pure research—research without specific practical ends—results in general knowledge and understanding of nature and its laws. This general knowledge provides the means of dealing with many practical problems, though it may not give a specific solution to any one of them. Pure science research produces the knowledge upon which all applied science rests. Basic research thus becomes the pacemaker of technological progress.

Background research includes such activities as the preparation of accurate maps, the collection of meteorological data, the determination of physical and chemical constants, the description of species of plants and animals, and the establishment of various standards of products. It provides essential data for advances in both pure and applied science, which are widely used. This research often involves the coordinated effort of large numbers of trained personnel.

Applied research and development covers activities which have a definitely practical or commercial value; the aim is distinctly utilitarian, and the findings are for immediate use in doing something or making something. Much of the research in the agricultural experiment stations and in industry comes within this category. This form of research has been greatly emphasized, partly because of its direct economic value and partly because its results are so immediately apparent.

The boundaries between the three categories of research activities are by no means clear-cut. A recent report says:

"The distinction between applied and pure research is not a hard and fast one, and industrial scientists may tackle specific problems from broad fundamental viewpoints. But it is important to emphasize that there is a perverse law governing research: Under the pressure for immediate results, and unless deliberate policies are set up to guard against this, *applied research invariably drives out pure.*

"The moral is clear: It is pure research which deserves and requires special protection and specially assured support."[2]

Dental Research

In recent years the dental profession has exhibited much interest in research on dental problems, but funds available for such investigation and study have been very limited. Accordingly, the profession, through its organizations, has requested the Congress to make appropriations for this work, and bills have been introduced for the purpose. Two early bills failed to pass. The most recent bills were introduced in the Senate by Senator Murray (S. 190, January 10, 1945) and in the House of Representatives by Congressman Priest (H. R. 3816, July 16, 1945). They are identical; committees of the American Dental Association had a leading part in the preparation of the bills.

Murray bill.—The Murray bill would establish in the National Institute of Health[3] of the United States Public Health Service a division to be known as the National Institute of Dental Research. It would also create the National Advisory Dental Research Council to consist of the Surgeon General of the Public Health Service and six members appointed by him, at least four of them dentists, for 3-year terms. The administrative features of the bill are almost identical with those of the act creating the National Cancer Institute in the National Institute of Health in 1937.

The measure would authorize and direct the Surgeon General, through the Institute and in cooperation with the Council: (1) To conduct, assist, and foster research relating to dental diseases and conditions; (2) to promote the coordination of research conducted by the Institute and by other agencies and individuals; (3) to provide fellowships in the Institute; (4) to secure consultation services for the Insti-

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[1] *Cf. Science: The Endless Frontier.* A Report to the President by Vannevar Bush, July 1945. Washington, D. C., U. S. Government Printing Office, 1945, p. 75-77.

[2] Ibid., p. 77.

[3] The National Institute of Health is the scientific research bureau of the Public Health Service.

tute; and (5) to cooperate with State health agencies in the prevention and control of dental diseases and conditions. By implication, grants-in-aid for dental research by institutions and individuals would be authorized from funds available.

An appropriation of $1,000,000 would be authorized for the erection and equipment of a building and facilities for the Institute, and an annual appropriation of $730,000 would be authorized to maintain the Institute and carry on the research.

Hearings.—Committee hearings have been held on the Murray bill. The extent of dental needs was pointed out; it was said that 95 percent of the school children have active caries, that among the first 2,000,000 men called for service in the war, 21 percent of the rejections were the result of dental deficiency, and that this percentage led all other causes of rejection in this group of men. It was also indicated that progress has been made in the study of dental decay, but that funds available for dental research were grossly inadequate to meet the need.

The only apparent opposition to the bill came from a group of physicians who thought that to establish a separate institute and building for each panel of health and medicine is an unsound policy, that "the components of medicine" cannot be isolated from one another to advantage. They suggested: (1) That the facilities of the National Health Institute be enlarged sufficiently for administration and for those research activities that could most advantageously be conducted in or near the District of Columbia; and (2) that the Surgeon General become the trustee of funds intended for the promotion of dental research.

Several persons at the hearings suggested changes in the bill. It was said that a provision should be included to allocate at least one-half of the annual appropriations to educational institutions for conducting dental research. One witness suggested provision for a fixed sum to be given annually to any approved dental school which made application for it to carry on research.

No action has been taken on either of the two bills.

It may be noted in passing that the Surgeon General of the Public Health Service already has broad authority to conduct research relating "to the causes, diagnosis, treatment, control, and prevention of physical and mental diseases and impairments of man." He is authorized: (1) To collect and make available information on such research; (2) to establish and maintain research fellowships in the Public Health Service; and (3) to make grants in aid to institutions and individuals for recommended research projects. In recent years a number of significant dental studies have been made by the Public Health Service dealing particularly with problems of mottled enamel and dental caries.

Military Research

Research that has been most in the foreground during the past few years is that which has been for military purposes. Efforts are now being made to arrange for the continuance of much of this work in peacetime.

Development of a plan.—Early in 1944 the War Department and the Navy Department began to plan for the establishment of an agency to maintain military scientific research after the war. In June the Secretary of War and the Secretary of the Navy appointed a 13-man committee on postwar research to study the various aspects of postwar research and development needs of the War and Navy Departments, and to recommend a plan for carrying on such work after the war.

The committee took it for granted that the Army and the Navy must continue to carry the major responsibility for military research. Nevertheless it recognized that a way should be found for keeping the country's outstanding scientists interested in military research so as to give the Army and the Navy the continued benefit of their assistance. The committee believed that the best device for accomplishing this objective is the prosecution of scientific research by contracts under a board of civilians and officers of the Army and the Navy.

In considering a plan the committee had before it two proposals, one to set up a board under the National Academy of Sciences, and the other to establish by legislation an independent Government agency. Under the first plan, funds for expenditure by the Board would be appropriated to the War Department and the Navy Department and earmarked to be made available to the National Academy for research. This arrangement would be similar to that under which the National Research Council now operates. Under the other plan, funds would be appropriated by the Congress direct to the Government research agency. This arrangement would be similar to that for the Office of Scientific Research and Development or the National Advisory Committee for Aeronautics.

When the committee made its report in September it recommended: (1) The legislative establishment of a permanent Research Board for National Security as an independent agency; and (2) a request of the

National Academy of Sciences that it establish a Research Board for National Security as an immediate measure.

Very informative hearings were held on this subject in November 1944 by the House Select Committee on Post-War Military Policy. There was general agreement concerning the objectives to be accomplished by enlisting the aid of civilian scientists in military research, but there was disagreement as to whether the means for obtaining this aid should be an independent Government agency or a board under the National Academy of Sciences. In May 1945, this committee made a report strongly approving Federal provision for military research.

One motivating factor in the effort to create a civilian research agency was the belief that, while certain kinds of applied research can be carried on satisfactorily by an operating organization—in this case by military agencies and military men—fundamental research should not be controlled by an operating organization, but should be entrusted to scientists who are throughly trained for that purpose and are given a great measure of freedom from the usual performance controls and production pressures.

Early in 1945 the President of the National Academy of Sciences, upon request of the Secretaries of War and the Navy, established the Research Board for National Security, to operate within the Academy. This action was intended as an interim measure until a national policy could be developed.

Two bills, somewhat at variance with each other, have been introduced in the Congress to provide for military research—the Byrd bill (S. 825, April 4, 1945) and the May bill (H. R. 2946, April 28, 1945, replaced by H. R. 3440, June 11, 1945).

The Byrd bill.—The purpose of the Byrd bill is to establish a Research Board for National Security to insure the continued preparedness of the Nation by providing for the application of scientific research to national security. The Board would be an independent governmental agency composed of not more than 40 members appointed by the President. The membership would include officials from designated departments and agencies, together with civilian scientists, engineers, or industrialists approximately equal to the number of Army and Navy officers on the Board. The civilian members would be nominated to the President by the National Academy of Sciences. The members would serve without compensation. The Board would elect annually its chairman and vice chairman from its civilian membership. A director, elected by the executive committee of the Board, would receive a salary of $15,000.

It would be the function of the Board to formulate programs of scientific research and development relative to problems of national security, to direct and conduct the scientific study of such problems, and to advise the Secretary of War and the Secretary of the Navy on the applications of science to national security. The Board would in no way relieve the Army, Navy, or other governmental agencies of their responsibility for, or authority over research under their legal cognizance. It would be directed to make use of available governmental facilities and services and not to operate laboratories under its own auspices. The chairman of the Board would be authorized to contract for making reports, investigations, tests, and apparatus to promote the national security.

The May bill.—The May bill would authorize appropriations, not exceeding $8,000,000 for each fiscal year, to enable the National Academy of Sciences through a Research Board for National Security, to provide for scientific research and advancement desirable in the interest of national security. The Board would be established by agreement between the Secretary of War, the Secretary of the Navy, and the President of the National Academy of Sciences. All projects would be carried out by contracts or other arrangements made by the Academy with individuals, educational and scientific institutions, industrial organizations, and other public and private agencies. Funds appropriated in accordance with the act would be paid out on vouchers signed by or under the direction of the President of the Academy.

Discussion and action.—In May 1945 the House Committee on Military Affairs, to which the May bill had been referred, held hearings on it. The Senate Committee on Naval Affairs, to which the Byrd bill had been referred, held hearings in June and July.

At these hearings it was stated that the War Department approved the plan contemplated in the May bill. The President of the National Academy of Sciences also indorsed the plan.

The establishment of a Research Board for National Security was favored by Vannevar Bush, director of the Office of Scientific Research and Development, testifying on the May bill, but only as an interim measure until Congress would create an independent research agency. He said:

"* * * we would be able to construct a more permanent organization for scientific research on

military problems if we now knew what the over-all agency for research on nonmilitary matters within the Government was going to be. Some such nonmilitary research organization is clearly desirable. It is particularly important that we do not allow problems of military research to occupy a disproportionate number of our best scientists. A balance between purely military research and fundamental scientific research of general utility must be struck. A proper balance would place far the greater emphasis on the basic research which is primarily of peacetime importance to the health of our citizens, to industry, and to our national well-being. The balance must be set and maintained by the Congress." [4]

The principal objection to the May bill concerned the appropriation of funds by the Congress to a private corporation. Some who discussed this feature of the bill thought it not sound policy to make a direct appropriation to a non-Government agency; in fact, strong opposition was expressed to such a policy. Others had some question as to whether there was authority to make such an appropriation.

The May bill was favorably reported to the House of Representatives on June 11, and 8 days later it was debated and passed. In the Senate it was referred to the Committee on Naval Affairs on June 20.

The plan contemplated in the Byrd bill was favored by the Navy Department, the chairman of the National Advisory Committee for Aeronautics, and the Department of the Interior.

The Byrd bill was favorably reported to the Senate on July 28 by the Committee on Naval Affairs. The report said:

"The committee is familar with the suggestion that a National Research Foundation be created by the Congress to develop and promote a national policy for scientific research and education, and develop scientific talent in this country. It is believed that serious study should be given this important subject. It is suggested, however, that before final action is taken on any such plan, the entire field of scientific methodology be surveyed to determine what procedures could be taken to insure that scientific methods be employed in the so-called social sciences as well as in the so-called material sciences. * * *

"In the interim, it is recommended that the bill S. 825, establishing a Research Board for National Security to carry on scientific research in the interests of national security be enacted. If, at a later date, it is found desirable to create a National Research Foundation, the Board created by the present bill could be placed under and be made a part of such foundation." [5]

[4] *Research and Development.*—Hearings before the Committee on Military Affairs, House of Representatives, 79th Cong., 1st sess., on H. R. 2946, May 22, 23, and 29, 1945. Washington, D. C., U. S. Government Printing Office, 1945. p. 7.

[5] *Establishing a Research Board for National Security*, 79th Cong., 1st sess., S. Rept. No. 551. July 28, 1945, p. 6.

Research Useful for Business

In recent years there has been much public discussion of ways and means to encourage the development of small business and to assure the maximum use of new inventions. This concern is reflected in a bill introduced in the Senate by Senator Fulbright (S. 1248, July 19, 1945).

One of the major purposes of the Fulbright bill is "to promote in the national interest the fullest and speediest introduction of new techniques in science and invention, and in manufacturing, communication, and other phases of productive activity." Another purpose is "to promote the maintenance of free enterprise by making available to small and medium-sized business, scientific and technical inventions, products, and processes." Still another purpose is to aid, encourage, and protect the research and enterprise of inventors, scientists, and institutions engaged in scientific work and to make the results of their work more readily available. To compile and maintain a comprehensive inventory of the findings and data of scientific research and development and make such information available to the public would also be a purpose of the legislation.

The bill would create in the Department of Commerce a Bureau of Scientific Research headed by an administrator who would be appointed by the President by and with the advice and consent of the Senate. To this Bureau would be transferred the functions and personnel of the National Inventors Council and the Office of Production Research and Development of the War Production Board. The Bureau would be authorized to use the facilities of the National Bureau of Standards and other Government agencies and to construct or procure such additional facilities as would be required for its work.

The bill is now in the hands of the Senate Committee on Commerce.

Comprehensive Research Programs

Proposals for comprehensive Federal research programs have been formulated in two bills. These are based largely upon two significant reports

emanating from Government sources. Both of these reports were reviewed in *Higher Education and National Defense, Bulletin No. 90* (August 20, 1945), published by the American Council on Education.

Magnuson bill.—As previously reported in HIGHER EDUCATION (March 15, 1945), President Roosevelt in November 1944 requested Vannevar Bush, Director of the Office of Scientific Research and Development, to make recommendations to him on four questions related to research. Dr. Bush made a report to President Truman in July 1945.[6]

The Bush report contains a number of recommendations, among them one for the establishment of a National Research Foundation "to promote scientific research and scientific education." It recommends also that provision be made for "a reasonable number of (a) undergraduate scholarships and graduate fellowships and (b) fellowships for advanced training and fundamental research."

A bill (S. 1285, July 19, 1945) has been introduced in the Senate by Senator Magnuson which would give effect to the Bush recommendations. Identical versions of this bill have been introduced in the House of Representatives by Congressman Mills (H. R. 3582, July 19, 1945) and Congressman Randolph (H. R. 3860, July 20, 1945).

Kilgore-Johnson-Pepper bill.—Soon after the attack on Pearl Harbor, the chairman of the Senate Committee on Military Affairs, Elbert D. Thomas appointed a Subcommittee on War Mobilization with Senator Harley M. Kilgore as chairman. In January 1945, this Subcommittee made an extensive report on the Government's wartime programs of research and development,[7] and in the following July it reported a series of findings and recommendations.[8] Among the recommendations was one to establish a central scientific agency of the Government with extensive powers to promote scientific research and development.

Members of the subcommittee drafted a bill, which was introduced in the Senate by Senator Kilgore, for himself, Senator Johnson of Colorado, and Senator Pepper (S. 1296, July 23, 1945).

Principal provisions of the bills.—The principal provisions of the two bills have been summarized as follows:[9]

[6] *Science—The Endless Frontier.* A Report to the President by Vannevar Bush. Washington, D. C., U. S. Government Printing Office, 1945. 184 p.

[7] *The Government's Wartime Research and Development, 1940–44, Part I.—Survey of Government Agencies.* Report from the Subcommittee on War Mobilization to the Committee on Military Affairs, United States Senate, January 23, 1945. 79th Cong., 1st sess., Senate Subcommittee Report No. 5. Washington, D. C., U. S. Government Printing Office, 1945. 326 p.

[8] *The Government's Wartime Research and Development, 1940–44, Part II.—Findings and Recommendations.* Report from the Subcommittee on War Mobilization to the Committee on Military Affairs, United States Senate, July 1945, 79th Cong., 1st sess., Senate Subcommittee Report No. 5. Washington, D. C., U. S. Government Printing Office, 1945. 74 p.

[9] Adapted from a comparative table in *Legislative Proposals for the Promotion of Science: The Texts of Five Bills and Excerpts From Reports.* Subcommittee on War Mobilization of the Senate Committee on Military Affairs, August 1945. 79th Cong., 1st sess., Subcommittee Print. Washington, D. C., U. S. Government Printing Office, 1945. 89 p.

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Magnuson bill	Kilgore-Johnson-Pepper bill
A. Administrative agency	
Creates a National Research Foundation. Powers vested in Board of nine members (no compensation) appointed by President on basis of demonstrated capacity for the job and not on ex officio basis. Director ($15,000 a year) appointed by Board. Transfers Office of Scientific Research and Development to Foundation.	Creates a National Science Foundation. Powers vested in Director ($15,000 a year) appointed by President. National Science Board, consisting of eight Government officials plus eight public members appointed by President, acts in advisory capacity.
B. Coordination of research	
Directs Foundation to promote "a national policy for scientific research and scientific education."	Directs Foundation to survey and study all Government-financed research and development activities, and to send to the President and to the agencies concerned recommendations for such changes as appear desirable.

C. Military research

Sets up Division of National Defense, with advisory committee appointed by Board, except that one member shall be appointed by Secretary of War, and one member by Secretary of Navy.

Sets up Research Committee for National Defense, with chairman ($12,000) appointed by President, three members by Secretary of War, three members by Secretary of Navy, and three members by Director of Foundation. Committee approves all military research contracts (at least 20 percent of appropriated funds).

D. Medical research

Sets up Division of Medical Research, with advisory committee appointed by Board, and devoted to research in biological sciences including medicine and related sciences.

Sets up Research Committee for Health and the Medical Sciences, with chairman ($12,000) appointed by President, three members by head of Federal Security Agency, and six members by Director of Foundation. Committee approves all medical research contracts (at least 20 percent of appropriated funds).

E. Other reseach

Sets up, in addition to above, a Division of Physical Sciences, with advisory committee appointed by Board, for research in the mathematical and physical sciences. Authorizes Board to create from time to time such additional divisions as it deems necessary so as to permit any arrangement required to support basic scientific research and scientific development in the interest of national security and welfare.

Authorizes Foundation to promote any research that is in the national interest, including, in addition to above, research in basic sciences, natural resources, methods and processes beneficial to small business, and peacetime uses for wartime facilities. Authorizes Director to set up such advisory research committees as may be needed.

F. Research facilities

Authorizes Foundation to support scientific research "through contracts, grants, or other forms of assistance." Foundation may acquire but not operate any scientific or technical facilities of its own.

Directs Foundation to use existing facilities of Federal, State, and local governments, educational institutions, research foundations, and private industrial organizations. At least 50 percent of Foundation's funds to be spent through contracts with nonprofit educational institutions and research institutions. New facilities may be acquired but not operated by the Foundation itself. All research to be done under contract only.

G. Research findings

Sets up Division of Publications and Scientific Collaboration and authorizes Foundation to publish and disseminate information of scientific value, consistent with requirements of national security. The Foundation, like other Government agencies, is left with full power to negotiate such patent arrangements with research contractors as particular situations may require in the public interest.

Directs Foundation to make available to the public full data on all significant findings. Also, by means of publications, abstracts, library services and the like, to promote a widespread distribution of information useful in research. Authorizes Defense Committee to classify information when necessary for national security. Stipulates all inventions and discoveries resulting from Government-financed research are to become property of the United States and to be generally available through royalty-free nonexclusive licenses.

H. Scholarships for study

Sets up Division of Scientific Personnel and Education to grant scholarships and fellowships in the mathematical, physical, and biological sciences. Persons receiving such scholarships and fellowships to be enrolled in a National Science Reserve and to be available for call by the Government for scientific and technical work in times of national emergency.	Authorizes Foundation to grant renewable 1-year fellowships and scholarships for study at nonprofit institutions.

I. Annual appropriations

Authorizes "such sums as may be necessary." Unobligated appropriations to remain available for 4 years following expiration of fiscal year in which appropriated.	Authorizes "such sums as may be necessary."

* * * * *

Status of the bills.—These bills are now in the hands of committees, the Magnuson bill with the Senate Committee on Commerce and the Kilgore-Johnson-Pepper bill with the Senate Committee on Military Affairs. It is reported that hearings are to be held on these bills in the near future. The Mills and the Randolph bills (identical with the Magnuson bill) are in the hands of the House Committee on Interstate and Foreign Commerce.

Conclusion

The Congress is now confronted with two specific questions regarding research: (1) Shall the Government accept new responsibilities for research, particularly pure research; and (2) if it does, what shall be the nature of the provision to discharge those responsibilities. One of two general methods may be followed if the Congress decides to meet the need for research; it may enact piecemeal legislation, making provision for research in one field at a time, or it may adopt a comprehensive plan which will be broad enough to cover all Federal research activities with perhaps the exception of certain applied research which is best carried on by the several operating agencies. Opinions differ as to which procedure is preferable.

Concerning this matter the Bush report says:

"The Government should accept new responsibilities for promoting the flow of new scientific knowledge and the development of scientific talent in our youth. These responsibilities are the proper concern of the Government, for they vitally affect our health, our jobs, and our national security. It is in keeping also with basic United States policy that the Government should foster the opening of new frontiers and this is the modern way to do it. For many years the Government has wisely supported research in the agricultural colleges and the benefits have been great. The time has come when such support should be extended to other fields.

"The effective discharge of these new responsibilities will require the full attention of some overall agency devoted to that purpose. There is not now in the permanent governmental structure receiving its funds from Congress an agency adapted to supplementing the support of basic research in the colleges, universities, and research institutes, both in medicine and the natural sciences, adapted to supporting research on new weapons for both Services, or adapted to administering a program of science scholarships and fellowships.

"Therefore I recommend that a new agency for these purposes be established." [10]

The Subcommittee on War Mobilization of the Senate Committee on Military Affairs has taken a similar position. It said that the Nation's research activity must be kept at a high level, that a balanced research program is needed, and that there should be a better coordination of the Government's scientific activities. The report reads:

"To the existing twoscore scientific agencies of the Federal Government, another half dozen were added to meet wartime needs. Some coordination of their work was achieved by an elaborate system of formal committees, in addition to numerous close and informal contacts on a personal basis between the Nation's scientists. Such coordination as now exists is of a temporary character and will end with the coming of peace. Some mechanism for coordinating Federal research activities must be worked out before we can arrive at an intelligent use of Federal research resources. This is necessary to a balanced postwar program of Federal research.

"The chief function of coordination should be: (1) To insure that the most important problems are

[10] *Science—The Endless Frontier.* P. 4.

receiving adequate attention; (2) to make possible the best matching of such problems with scientific workers and facilities; (3) to make significant findings available to all interested investigators as rapidly as possible.

"Such coordination will arise from a mutual exchange of information on problems, men, facilities, and findings. It cannot be accomplished by decree but by mutual understanding. Where exchange of information and mutual discussion does reveal the need for definite action to achieve more efficient coordination of activity, final responsibility to assure that necessary action is taken should rest with a central scientific agency or with an over-all supervisory agency such as the Bureau of the Budget.

"The scope of such coordination should be the whole range of Federal scientific activity. This in turn should be balanced with private activity through cooperative mechanisms and the advisory participation of leading scientists and administrators from private institutions." [11]

The creation of a single Federal research agency has recently been urged by the President in his message to the Congress.

One other observation may be made. The bills mentioned in this article deal with research in the fields of science and technology. The report on the Byrd bill recognizes clearly the need for research in the social sciences, but no reference to this field occurs in any of the research bills. The recent message of President Truman calls attention to this field of study by including among the functions to be discharged by a Federal research agency that of promoting and supporting "research in the basic sciences and in the social sciences."

As further developments occur with respect to these bills they will be reported in HIGHER EDUCATION.

Disposition of Personnel in Certain Navy Training Programs

Decision on the disposition of personnel now engaged in certain Navy training programs, including the larger officer training programs, has been made by the Navy Department.

Trainees in Naval Reserve Officers Training Corps scheduled to graduate in the term ending November 1 will be retained on active duty after commissioning unless they are eligible for release on points under the demobilization formula.

Transfers to the NROTC program from V–12 will increase the number in NROTC to approximately 19,000 by November 1. Final disposition of other groups now enrolled in the NROTC or scheduled to be so enrolled will be determined at a later date.

Engineers, physics majors, aerology majors and presupply candidates will complete their training in V–12 and will be retained on active duty. They will be commissioned as officers upon the completion of their V–12 courses, or upon the completion of further training, to be subsequently determined.

Medical, dental, theological, premedical, predental and pretheological students will be released to inactive duty in the Naval Reserve, with the stipulation that they continue their medical, dental, theological, premedical, predental or pretheological training.

In the midshipman training program, carried on through the Naval Reserve Midshipmen's Schools, all graduates prior to September 1 and since that date have been called to active duty. Those graduating in the future will be retained on active duty as officers.

Aviation cadets in training under the V–5 program will be released, without restriction as to number, to inactive duty if they do not wish to continue their training. Aviators are in excess and are being released under reduced critical scores in the Navy demobilization plan. The length of time (18 months), the expense, and the hazards in training aviation cadets were other factors in this decision.

As previously announced, the program for enlisted personnel training as radio technicians and aviation radio technicians has been returned to the status under which it operated prior to August 15. All men engaged in this training program, including those at recruit training centers, will complete an accelerated course if they so desire. They are given the option of transferring to general service. Trainees in this program who voluntarily enlisted in the Regular Navy since August 22 to continue their radio technician training may remain in the Regular Navy or may revert to their former status.

Research

(*Concluded from page 1*)

"Our economic and industrial strength, the physical well-being of our people, the achievement of full employment and full production, the future of our security, and the preservation of our principles will be determined by the extent to which we give full and sincere support to the works of science.

"It is with these works that we can build the highroads to the future."

[11] *The Government's Wartime Research and Development, 1940–44, Part II—Findings and Recommendations.* p. 13.

THE CLEARING HOUSE

Items from colleges, universities, and higher education associations

Expansions Planned by the University of Illinois

The University of Illinois is planning to expand its activities in several new directions. Its budget for the biennium 1945–47, the largest in its history, includes provision for a veterinary college, an institute of labor relations, a department of public health, and a small homes council. The University regards a veterinary college as an institution from which the State will derive great profit, because of the location within the State of the great meat-producing and meat-packing industries. There is present need, the University believes, for an agency to give information and advice in connection with the vast amount of construction its anticipates will follow the war. The Smail Homes Council, which will be an organization of many divisions of the University, will be set up to fill this need. Its function will be collecting and disseminating information about small homes problems, and aiding the public in community and neighborhood planning, methods of financing, homesite requirements and landscaping, planning and design, materials and construction, and utilities and appliances.

Appropriations for initiating the work of making these facilities available have been made for the current year. In addition, provision has been made for the support of graduate work and research on a wide basis; for increased facilities for the offering of a new program in aeronautical engineering; for increasing and strengthening the work in foods research and technology; for expanding the School of Nursing; and for increasing and improving services in many other fields of the University's activities.

University of California Courses to Aid Reconversion

To assist businessmen with reconversion problems, the University of California at Los Angeles is offering a large number of business administration courses in the downtown Los Angeles area. A series of lectures on industrial relations are to be delivered by a public panel member and arbitrator with the War Labor Board, who also will conduct a special university course on personnel administration. The tenor of the lectures is indicated in the statement that "if this country is to be prosperous and continue to play a unified part in the reconstruction of the world, we must develop our techniques for achieving agreement, fairness and compromise between organized capital and organized labor." It is believed that those techniques evolved for solving problems which occurred in various plants and industries during the war years must be continued and improved upon if the United States is successfully to avoid major pitfalls of the immediate postwar period.

College Physical Fitness Programs Based on Army and Navy Programs

Two institutions, Cornell University and Colorado Agricultural and Mechanical College, taking a lesson from the physical conditioning wartime programs of the Army and the Navy, have adopted programs in which sports play an important role. Swimming, tennis, golf, handball, bowling, fencing, and other sports are to be taught for their health and recreational value.

The program at Cornell, which became effective at the opening of the fall session, is compulsory for all men students during their freshman and sophomore years. Students will be required to devote 3 hours a week to the program during these 2 years, and it is hoped that they will continue to carry on their favorite sports through the upper-class years and on into later life. The Medical Department of the University is cooperating in the program by providing corrective exercises. Except as respects swimming, which will be compulsory for all nonswimmers, the student, after his first term, may state his preference for a certain sport and follow that exclusively in season. It is hoped that this policy will insure a recreational interest in more than one game and contribute to a year-round physical activity.

The program at Colorado Agricultural and Mechanical College follows the same general lines as that at Cornell and is operated in close cooperation with the college health service. There is a program for women similar to that for men. Intramural sports form an important part of the programs for both men and women, and facilities for their expansion are soon to be made available, so that every student on the campus will have an opportunity to take part in some athletic team competition. Intercollegiate athletics, which have always been encouraged at the College, will continue to be a part of the physical education program.

SPECIAL NOTE

Institutions and associations are invited to send to HIGHER EDUCATION, from time to time, materials dealing with such matters of general interest as new policies and practices, programs, projects, studies, and reorganizations.

Training Occupational Therapists

General Omar N. Bradley, Administrator of Veterans' Affairs, has approved a 12-month earn-while-learning program for young women and men using the facilities of the Philadelphia School of Occupational Therapy, Philadelphia, Pa., and the St. Louis School of Occupational Therapy and Recreation, St. Louis, Mo., for the training of occupational therapists to meet the expanding needs of the Veterans' Administration, the agency announced recently.

Courses for 36 students at each school are scheduled to open November 1, 1945. The age limit for students is 35 years, and qualifications are graduation from an accredited college, with major studies in fine or applied arts, industrial art or home economics, and adequate knowledge of at least three different skills such as woodwork, photography, weaving, metalwork, ceramics, plastic, printing, carving, bookbinding, or varied crafts including leather work, cord knitting, fly tying and possibly other miscellaneous skills.

Applicants accepted as students become employes of the Veterans' Administration as occupational therapy trainees (SP–3) at a salary of $1,704 per annum for the first 4 months, during which time the courses are conducted at the schools. After satisfactorily passing the school curricula, students continue their courses and receive 8 months' clinical experience at Veterans' Administration Hospitals as apprentice occupational therapy aides (SP–4) at a salary of $1,902 per annum.

Following acceptable completion of the entire 12 months' training, students will be awarded diplomas and employed by the Veterans' Administration as occupational therapists (P–1) at an annual base salary of $2,320 per year.

College graduates, preferably women, who are under 35 years of age and who are interested in enrolling for these courses are urged to communicate immediately with the Medical Director, Veterans Administration, Vermont Avenue between H and I Streets NW., Washington 25, D. C.

Selection of students is made by the Veterans' Administration and the school for which they applied.

NEW PUBLICATIONS

Government Publications

How to Obtain

(*1*) *Cost Publications: Send request, enclosing remittance (check or money order), to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

(*2*) *Free Publications: Request direct from the agency issuing them.*

From the U. S. Office of Education

The Place of Visiting Teacher Services in the School Program, by Katherine M. Cook. Washington, D. C., U. S. Government Printing Office, 1945. 46 p. 10 cents. (U. S. Office of Education Bulletin 1945, No. 6.)

Contains the findings of a study of visiting teacher services in cities of the United States 10,000 and above in population. Includes a discussion of the importance of pupil personnel services in schools, a brief historical statement of the development of visiting teacher services in city school systems, a discussion of the present status of these services as disclosed by the study, and suggestions as to means of extending and improving them.

Proceedings of the Sixth National Conference of State Supervisors of Occupational Information and Guidance. Washington, D. C., U. S. Government Printing Office, 1945. 95 p. 20 cents. (V. D. Bulletin No. 235, Occupational and Guidance Series No. 14.)

Part I contains 8 reports on general problems in guidance work with such titles as "A One-Year Functional Graduate Program in Occupational Information and Guidance," "The Guidance Program in the Elementary School," and "The Relation of Work Experience to Guidance." Part II provides a somewhat detailed description of the duties of State supervisors of occupational information and guidance written by the 27 supervisors present. The conference was made up of 70 persons from 34 States representing various fields of professional interest.

Selection of Students for Vocational Training, by Fred M. Fowler. Washington, D. C., U. S. Government Printing Office, 1945. 156 p. 30 cents. (V. D. Bulletin No. 232, Occupational Information and Guidance Series No. 13.)

This bulletin represents a study contributed to by 188 schools in 39 States. It presents problems of selection of vocational trainees and the practices which in many schools were used to solve these problems. It views selection as a process made up of 2 parts—the *decision* of the admitting institution, and the *choice* of the prospective student. The bulletin finds that the activities of adequate guidance programs, both in vocational schools and in institutions from which they draw their students, form the most efficient basis for selection procedures. The study is analytical rather than statistical in nature. It includes references and 49 reproductions of forms used for guidance and selection purposes by the reporting schools.

Pamphlets

Education of Veterans in New York State, by John S. Allen *and others*. University of the State of New York Bulletin, Number 1300. September 1, 1945. 64 p. Free.

A manual designed to assist educational institutions and all persons concerned with the education of veterans. Contains information on separation programs and counseling programs of the military services, relation of civilian agencies to the education of veterans, scholarships, educational programs of the armed forces, educational facilities available to veterans, and the financing of veterans' education.

Educators Guide to Free Films, compiled and edited by Mary Foley Horkheimer and John W. Diffor. Randolph, Wis., Educators Progress Service, 1945, fifth edition. 254 p. mimeo. $4.

An up-to-date annotated list of free films and slide films available to educators interested in visual aids; indexed by title, subject, and source.

"*Liberal Education for Democracy*," by Alwin Thaler. Phi Beta Kappa address delivered at the University of Alabama, May 24, 1945. *University of Tennessee Record, Extension Series*, Vol. 21, No. 2, July 1945. 12 p. Free.

Discusses the grounds for the hope that liberal education may yet thrive, and deals with factors that may make liberal education fit to serve democracy.

A List of Publications of the National Research Council. Washington, D. C., National Research Council, National Academy of Sciences, July 1945. 16 p. Free.

Lists the publications of the Council and the prices.

Public Education in Alabama; A Report of the Alabama Educational Survey Commission. Washington, D. C., American Council on Education, 1945. 452 p. $1.

Presents facts and recommendations concerning public elementary and secondary education, public higher education, and special State educational institutions in Alabama. Proposes a plan for the coordinated control of public education in the State.

Source Book on Federal-State Relations in Education, by (1) Educational Policies Commission of the National Education Association of the United States and the American Association of School Administrators, and (2) Problems and Policies Committee of the American Council on Education. Washington, D. C., The Commission and The Committee, 1945. 159 p. $1.50.

A convenient source book to accompany the policy statement on Federal-State Relations in Education recently issued by the Commission and the Committee. States the issues involved in Federal relations to education which have been recognized as important in the many studies of the subject that have been made to date, and quotes under each issue the position or recommendation of each important committee or organization which has made a study of the problem during recent years.

A Vocabulary of Business and Economic Terms of Popular Usage, by Armon Jay Lawrence. Bulletin of the Bureau of School Service, College of Education, University of Kentucky, Vol. 17, No. 3, March 1945. 134 p. 50 cents.

Report of a research project to derive a vocabulary of terms with business and economic meanings from current nontechnical literature of high circulation; designed primarily for business education.

Books

Marshaling Florida's Resources, edited by Charles T. Thrift, *Jr.* Lakeland, Fla., Florida Southern College Press, 1945. 96 p. $2.

Papers presented at a conference at Florida Southern College. Among the topics discussed are: Education for peace, America's place in the postwar world, the South, and Florida's problems and human resources. Reports are included on education, religion, social work, and government.

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